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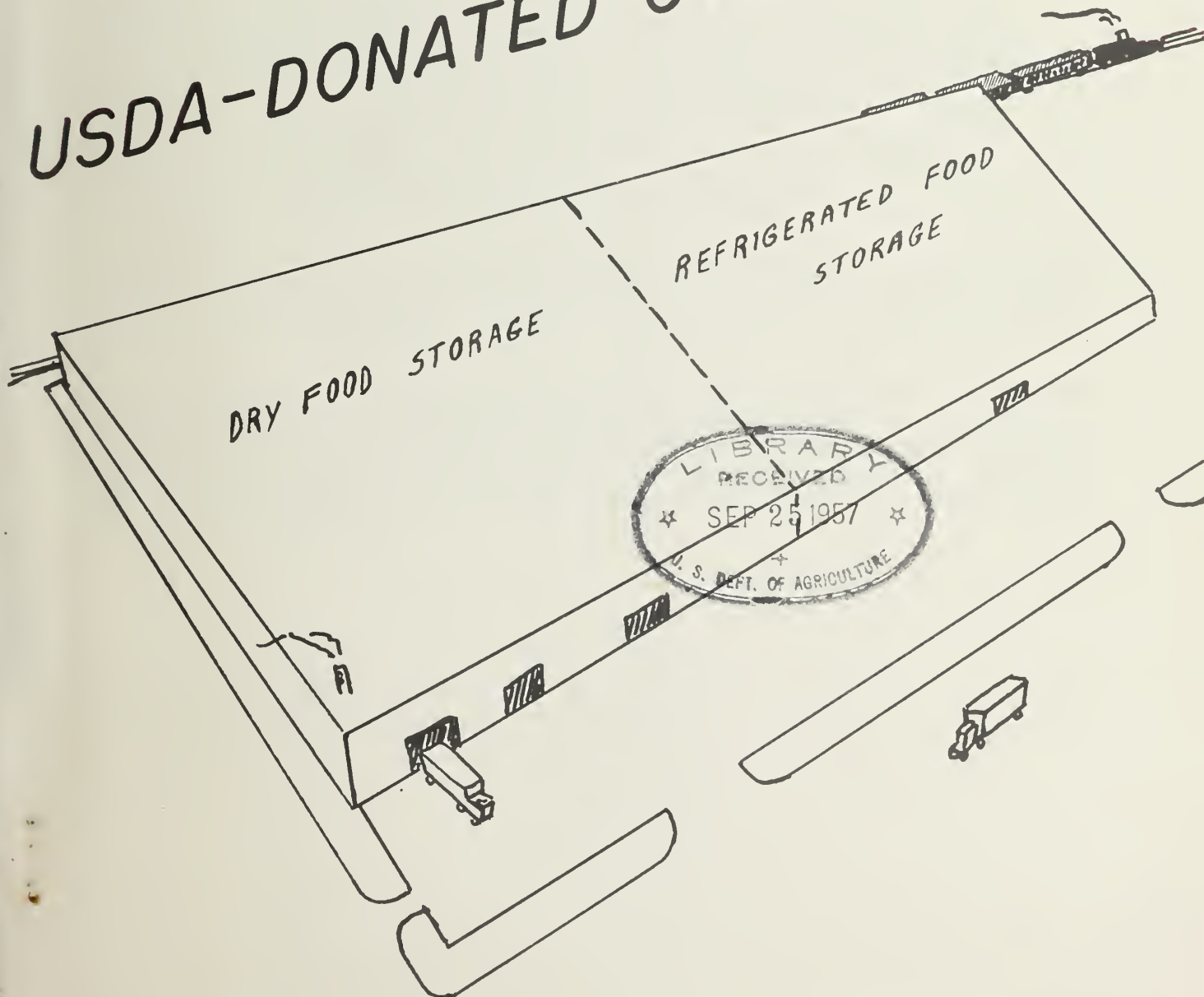
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PRELIMINARY

For review purposes only

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WAREHOUSE STORAGE GUIDE FOR USDA-DONATED COMMODITIES



PREFACE

Agencies that accept USDA-donated commodities also accept the responsibility to store and handle them properly. Failure to do so may result in the Government withholding further donations of commodities or in requiring restitution for commodities that are lost or become spoiled.

This Warehouse Handbook is designed to guide distributing agencies in the proper method of handling and warehousing USDA-donated commodities which are available to State agencies for distribution to schools, institutions, welfare, and other eligible outlets.

The information in this handbook has been drawn from many sources and includes the latest research available on handling and storing of the various commodities being distributed. This material has been assembled to acquaint distributing agencies with the type warehouses, storage facilities, and equipment needed for handling and storing USDA-donated commodities.

In using this Guide, consideration should be given to the geographic location of the warehouse and local situations prevailing in the area, with particular attention given to the climatic conditions.

A separate handbook, "Food Storage Guide for Schools and Small Institutions", has been prepared to guide local agencies such as schools and small institutions, in the best methods of handling and storing USDA-donated commodities at the place of utilization.

In many instances, commodity losses resulting from deterioration and infestation are traceable to inadequate storage facilities, undesirable handling practices, and other conditions which may be corrected by the application of the preventive and control measures outlined in this handbook. The information presented herein is also applicable to the handling and warehousing of locally purchased foods.

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WAREHOUSE STORAGE GUIDE FOR USDA-DONATED COMMODITIES

The term "Warehouse" applies to any facility where commodities are received in carlots or portions thereof and held in storage.

All USDA-donated commodities are of top quality, and are purchased on a specific grade under Government inspection. Therefore, careful consideration must be given to the selection of storage warehouses needed to make sure that commodities offered or requested for distribution are stored in such a way as to maintain their high quality and nutritive value.

Two types of warehouse facilities are needed: DRY and REFRIGERATED. Their adequacy may be measured by the extent to which these facilities attain the following objectives:

PROTECTION OF COMMODITIES -- This involves consideration of the type of building needed; temperature, humidity and ventilation; safeguarding from theft; and damage by the elements, fire, insects, rodents, molds, yeasts and bacteria.

CONTROL OF COMMODITIES -- This involves the maintenance of inventory records and the arrangement of the commodities so that their identity, location and the quantity on hand may be readily determined.

THE CONSERVATION OF SPACE AND LABOR -- This involves the maximum use of storage aids and equipment consistent with the storage and handling methods that are practicable within the limitations of space, labor, and funds available.

PART I--PROTECTION OF COMMODITIES

LOCATION OF WAREHOUSE

The dry and refrigerated warehouse facilities should be conveniently located near each other, preferably in the same building.

The facilities should be located adjacent to a railroad siding with ample truck loading docks to assure prompt handling of inbound and outbound shipments by railroad cars and/or trucks.

STORAGE SPACE

Care should be exercised when selecting or constructing warehouse facilities for storing USDA-donated commodities to determine their adequacy for the type of commodity to be stored, and the space required for the volume to be handled.

The amount of floor space needed should be determined by the type of commodity and floor load capacity. Sufficient floor space should be provided to permit ease of inspection, inventory, and removal of commodities.

GENERAL STRUCTURAL FEATURES

The warehouse should be tightly constructed; water-proof; rodent- and insect-proof; well-ventilated; and, if necessary, insulated to insure protection of the commodities from the elements. Provision should be made for sanitary hand washing and restroom facilities for the warehouse personnel.

The floors should be smooth to facilitate the use of hand- and/or mechanically-powered trucks in handling commodities, and strong enough to bear the weight of the commodities. The safe floor load capacity should be determined and approved by a State or local safety engineer or building inspector before the warehouse is accepted or approved for use.

All windows and outside doors should be screened to prevent entrance of rodents and insects. To prevent theft, all accessible windows should be covered with strong bars, and doors protected with bar locking devices.

Sufficient light, either natural or artificial, should be provided to insure safe and efficient operation. Poor light is contributory to unsatisfactory warehousing conditions generally. Wiring for artificial lighting should comply with National Electrical Code Requirements (an American Standard) together with other local requirements.

Large warehouses should be equipped with burglar alarm and sprinkler type fire protection and alarm systems. Small warehouses should have power- or hand-operated fire extinguishers available. This equipment should be inspected regularly and kept in usable condition.

DRY FOOD STORAGE

Good ventilation in the dry storage area is essential. By assisting in controlling the temperature and humidity, ventilation retards growth of various types of bacteria and molds, prevents mustiness and rusting of metal containers, and minimizes the caking of ground or powdered foods. Reliable thermometers should be provided to make sure proper temperatures are maintained.

In Common Dry Storage - the type generally used throughout the country - the ideal temperature of 50° to 70°F. can usually be maintained by proper insulation and by natural and/or mechanical ventilation. Natural ventilation is obtained by proper construction of the warehouse to permit entrance of fresh cool air through louvers at the floor level and the escape of warm air through louvers at the ceiling or roof level. Mechanical, or forced air ventilation (with intake and/or exhaust fans) keeps fresh air circulating.

Controlled "Cool" Dry Storage may be desirable in some instances. This can be a separate room or series of rooms or it can be a section of the dry food storage area partitioned off and insulated. The temperature of 45° to 50° F. and relative humidity of 55 to 60 percent can be maintained through the use of an air conditioning unit and/or a de-humidifier. If this is not practicable, some protection may be provided by covering the stacks with a poly-ethylene or similar plastic sheet. In areas where temperatures may drop below freezing, heating equipment should be installed to keep certain commodities from freezing.

REFRIGERATED FOOD STORAGE

A refrigerated storage space can be any artificially cooled, properly insulated room, or series of rooms in a warehouse where the desired temperature can be maintained by the use of refrigeration units. It must meet State and local building codes and inspection requirements for refrigerated storage areas. Reliable thermometers should be provided to make sure proper temperatures are maintained.

Two types of refrigerated storage space are needed:

Normal Refrigeration, maintained at a temperature of 32° to 40°F.,
"Freezer" or Frozen Food Storage, maintained at 0°F. or below.

RECOMMENDED TEMPERATURES FOR STORING
USDA - DONATED COMMODITIES

The recommended temperatures given below for storing USDA - donated commodities are based on research findings for specific foods. For optimum storage conditions, these temperatures should be followed.

COMMODITY	: Dry Storage:	Refrig. :	Freezer :	
	: (50° - 70°F)	Storage :	Storage :	Remarks
	: :	(32° - 40°F):	(0° or bel.):	
<u>Dairy Products</u>	:	:	:	:
Butter	:	:	:	:
Cheese	:	:	:	:
Milk, Nonfat Dry	:	:	:	:
<u>Eggs</u>	:	:	:	:
Shell Eggs	:	:	:	:
Dried Eggs	:	:	:	:
<u>Meat and Meat Products:</u>	:	:	:	:
Beef, Ground	:	:	:	:
Beef & Gravy, Canned:	:	:	:	:
Hams & Shoulders	:	:	:	:
(Fresh)	:	:	:	:
Frozen	:	:	:	:
Cured	:	:	:	:
Hams, Canned	:	:	:	:
Pork Loins	:	:	:	:
Pork Luncheon Meat,	:	:	:	:
Canned	:	:	:	:
Pork & Gravy, Canned:	:	:	:	:
Turkeys, Frozen	:	:	:	:
<u>Fats & Oils</u>	:	:	:	:
Cottonseed Oil	:	:	:	:
Lard	:	:	:	:
Olive Oil	:	:	:	:
Vegetable Shortening:	:	:	:	:
<u>Canned Vegetables</u>	:	:	:	:
Beans, Green	:	:	:	:
Beets	:	:	:	:
Carrots	:	:	:	:
Corn	:	:	:	:
Peas, Green	:	:	:	:
Tomatoes	:	:	:	:
Tomato Juice	:	:	:	:
Tomato Paste	:	:	:	:
Tomato Puree	:	:	:	:

COMMODITY	:Dry Storage : :(50° - 70°F):	Refrig. : Storage : (32°- 40°F):	Freezer : Storage : (0°or bel.):	Remarks
	:	:	:	:
<u>Canned Fruits</u>	:	:	:	:
Apples, Sliced	:	:	:	:
Applesauce	:	:	:	:
Apricots	:	:	:	:
Cherries	:	:	:	:
Cranberry Sauce	:	:	:	:
Figs	:	:	:	:
Grapefruit Sections	:	:	:	:
Grapefruit Juice	:	:	:	:
Orange Juice, Conc.	:	:	:	:
Peaches	:	:	:	:
Purple Plums(Prunes):	:	:	:	:
<u>Fresh Vegetables</u>	:	:	:	:
Beans, Green	:	:	:	:
Beets	:	:	:	:
Cabbage	:	:	:	:
Carrots	:	:	:	:
Potatoes, Irish	:	:	:	:
Potatoes, Sweet	:	:	:	:
Spinach	:	:	:	:
<u>Fresh Fruits</u>	:	:	:	:
Apples	:	:	:	:
Pears	:	:	:	:
Purple Plums	:	:	:	:
Peaches	:	:	:	:
<u>Dried Vegetables</u>	:	:	:	:
Beans	:	:	:	:
Onions	:	:	:	:
<u>Dried Fruits</u>	:	:	:	:
Apples	:	:	:	:
Apricots	:	:	:	:
Figs	:	:	:	:
Peaches	:	:	:	:
Prunes	:	:	:	:
Raisins	:	:	:	:
<u>Cereal Products</u>	:	:	:	:
Cornmeal, Whole	:	:	:	:
Cornmeal, Degermed	:	:	:	:
Flour, All Types	:	:	:	:
Rice	:	:	:	:
<u>Miscellaneous</u>	:	:	:	:
Honey	:	:	:	:
Nuts	:	:	:	:
Peanut Butter	:	:	:	:

PROTECTION OF COMMODITIES FROM ODORS

Commodities which absorb odors should be segregated from those that give off odors. Below is a representative listing of typical food items which give off and/or absorb odors:

: Commodity	: Give Off Odors :	: Absorb Odors :
: Apples, Fresh	: Yes.....	: Yes.....
: Butter	: No.....	: Yes.....
: Cabbage.....	: Yes.....	: No.....
: Cheese.....	: Yes.....	: Yes.....
: Eggs, Dried.....	: No.....	: Yes.....
: Eggs, Fresh Shell.....	: No.....	: Yes.....
: Milk, Nonfat Dry.....	: No.....	: Yes.....
: Onions.....	: Yes.....	: No.....
: Peaches, Fresh.....	: Yes.....	: No.....
: Potatoes.....	: Yes.....	: No.....
: :	: :	: :

Do not store items such as paint, kerosene, gasoline, oils, naphthaline, soap, wax, polishes, etc. in the same area with commodities. A separate storage room should be provided for such items.

SANITATION AND CLEANLINESS

Good housekeeping practices should be followed to insure orderliness and cleanliness in all areas of the warehouse. Any commodities dropped or spilled on the floor should be cleaned up immediately, since this invites rodent and insect infestation. All torn sacks, broken cartons, etc., should be removed from the warehouse and the product repackaged for immediate distribution. All used containers and sacks should be removed from the warehouse and stored in a separate room. Walls should be painted, calcimined, or whitewashed periodically. Floors should be scrubbed or mopped regularly and swept daily. The use of sweeping compound is recommended, but if not available, the floor should be sprinkled lightly before sweeping. Restrooms should be scrubbed daily. Running water should be available and an adequate supply of soap and paper towels readily accessible for the use of employees.

Rodent & Insect Infestation & Control

Rodents destroy or render unfit for human consumption enormous quantities of food each year. Rodents enter buildings through open doors, windows, and holes in the building around pipes and wires. They frequently burrow under floors and enter through ventilation and drain pipes and are carried in with containers of food. The most successful means of controlling rodents is prevention. All buildings

where commodities are stored should be rat-proofed. Rodents will not remain where there is no food, therefore, cleanliness is a very important factor in preventing infestation. All one-half inch or larger openings should be covered or sealed with $\frac{1}{4}$ inch galvanized hardware cloth or 26-gauge sheet metal. Fan and ventilation openings should be screened.

Insects also destroy and/or render unfit for human consumption enormous quantities of food each year. The following commodities are susceptible to insect infestation:

- (1) Whole grain (corn, beans, peas, rice, etc.)
- (2) Grain products (flour, cornmeal, cereals, etc.)
- (3) Dried fruits and vegetables (prunes, raisins, apricots, etc.)

There are many ways in which insect infestation may occur in a warehouse. Insects or insect eggs may be harbored in cracks in floors and walls of warehouses, in freight cars and trucks, in which they are transported, or in containers in which they were shipped, especially where the containers are reused without proper cleaning or fumigation. Insect infestation is evidenced by the presence of webbing, beetles, moths, larvae, holes in grain, or partly consumed products. In bagged commodities, insects are most generally found in the creases of the bags, along seams, or in the ears of the bags, and in the dark closed sections of boxes.

Insect infestation may occur even under ideal warehouse conditions, therefore, constant vigilance must be maintained for any sign of infestation, particularly during warm weather. Insect infestation of certain commodities such as cornmeal, flour, beans, rice, and dried fruits can be prevented by placing them in controlled "cool" storage, (45° to 50° F.), and/or refrigerator storage, (32° to 40° F.).

The most effective ways of eliminating and controlling both rodents and insects are by extermination and fumigation. This should be done by a reputable licensed fumigating or exterminating company.

POINTS TO CONSIDER:

Are both Dry and Refrigerated storage available?

Is the warehouse conveniently located?

Is the storage space large enough and the floor strong enough to hold the quantity of commodities to be stored?

Is the floor smooth enough to permit use of hand- and/or mechanically-operated trucks?

Is the warehouse free of holes in the floor or walls that would permit entry of rats or mice?

Is the warehouse free of cracks in the walls that might harbor insects?

Are the windows and doors screened and adequately protected against theft?

Is the warehouse well-lighted?

Are the temperature and humidity controlled in the dry storage space at all times?

Do normal refrigeration and freezer space meet requirements for refrigerated storage areas?

Are commodities which absorb odors segregated from those that give off odors?

Are good sanitation and housekeeping practices followed?

PART II - CONTROL OF COMMODITIES

INSPECTION OF COMMODITIES UPON ARRIVAL AT WAREHOUSE OR DISTRIBUTION POINTS

Prior to acceptance from carrier (whether by railway car or trucks) a thorough inspection of all commodities subject to insect infestation should be made before they are placed in the warehouse.

Commodities may be free of infestation when they leave the shipping point, yet arrive badly infested due to the use of an infested freight car or truck. Canned foods should be given a general inspection to determine if there are any damaged, disfigured, or discolored cases and/or cans which might indicate spoilage or deterioration of the product.

Commodities that are found to be out of condition at time of receipt should be recorded and segregated from other commodity stocks.

SALVAGE OF PARTIALLY OUT-OF-CONDITION COMMODITIES

It is often possible to salvage commodities when spoilage has not reached an advanced stage of decomposition, infestation, or contamination. It may mean sorting the good commodities from the bad ones and using the good ones immediately or storing them at lower temperatures. In other instances, it may be necessary to reprocess the products; for example, flour may be rebolted, rice recleaned and rendered suitable for human use.

Commodities reclaimed by fumigation should not be issued for human consumption until a sampling of the commodities has been analyzed by and written approval has been received from the U.S. Food and Drug authorities acknowledging that the samples examined are fit for human consumption.

DISPOSAL OF COMMODITY CONTAINERS

All used containers and sacks should be removed from the warehouse and disposed of. The containers should be used either in the redistribution or storage of commodities, or they may be sold and the proceeds applied to improve State distribution facilities.

INVENTORY RECORDS

Prompt and accurate checking and recording of commodity inbound shipments are essential. Each shipment received should be recorded on a prescribed agency receiving report or receipt document showing such information as the date, type and quantity of commodity received and the location in the warehouse. Any shortages in the shipment should be promptly reported.

In addition, it is essential that the warehouse manager record each outbound shipment, indicating such information as date, type and quantity of commodity removed, along with the name of the shipper and recipient.

A physical count of each commodity in storage should be made each month and balanced against the receiving and distribution reports to determine if there is any overage or shortage.

Shown below is a sample ledger sheet which provides for the minimum information needed to establish commodity control and which may be adjusted to fit the record requirements of most warehouses:

:	COMMODITY _____		UNIT _____		:
:					:
:	:	DESCRIPTION OF	:	QUANTITY	:
:	DATE	RECEIPT OR REMOVAL	:	RECEIVED	:
:	:	:	:	QUANTITY	:
:	:	:	:	REMOVED	:
:	:	:	:	BALANCE	:
:	:	:	:	ON HAND	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:

The information shown under the "Description of Receipt or Removal" column should identify and refer to the documents (e.g., bills of lading, delivery orders, delivery receipts, distribution schedules, inventory adjustments, records of losses, etc.) which authorize, confirm, and/or explain the receipt or removal of the quantity of commodities shown opposite the appropriate entry. These documents should be identified with the entries to which they apply and held in the warehouse files.

STACKING COMMODITIES

All commodities should be stacked on floor racks, skids, pallets, or some type of dunnage. In many instances, dunnage or pallets are also needed between layers to permit freer circulation of air under and around the stacks.

It is essential that sufficient space be allowed to permit easy accessibility for commodity inspection, inventory, and removal.

Main aisles must be wide enough for receiving and removing commodities and cross aisles wide enough for ventilation, inspection and inventory purposes. Width of the main aisles should be determined by the type of equipment used in storing and stacking commodities.

Good storage practices involve the use of the three dimensions of the facility and not merely the two dimensional floor space. Effective use of this third dimension (height) will more than compensate for the slight loss in floor space caused by leaving space between lots.

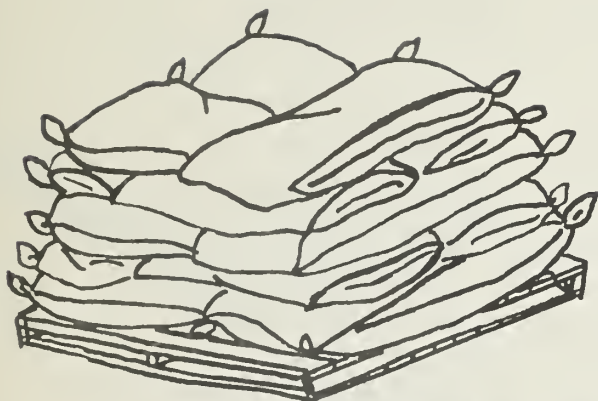
Stacking of commodities in uniform stacks on pallets is of utmost importance. Cased canned goods should not be stacked more than 20 cases high. Higher stacking often breaks cases and even bursts cans. Likewise, sacked commodities should not exceed 20 sacks in height. Excessive stacking frequently bursts sacks and causes pressure caking of finely ground grain commodities in the lower layers of sacks. In no case, however, shall the height of a stack exceed practical limits for safe lifting even though such heights may be allowable within the limits of the safe floor load.

For laying out bottom tiers according to approved methods and for computing the number of tiers that can be piled without exceeding the safe floor load limit, the following procedure is suggested:

Lay out the first tier in accordance with approved method. Measure the square foot area of the first tier as laid out, including the aisle and ventilating space. Multiply the approved per square foot safe floor load by the square foot area laid out. The result will be the total pounds of safe floor load for the area. Divide this total allowable weight for the area by the gross weight of the container to be stacked and the result will be the maximum number of a given type of container that can be piled in the area.

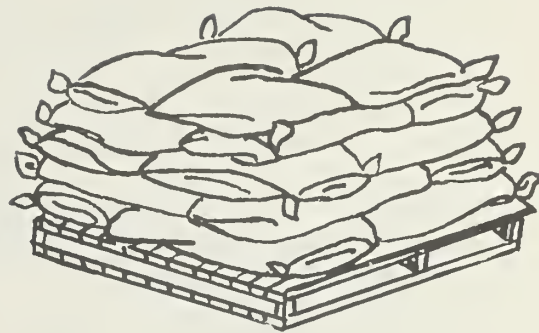
Example: Given a safe floor load of 90 lbs. per square foot, 100 lb. bags are to be stacked. The area of the stack, including aisle and ventilating space, is 4 feet by 4 feet or 16 square feet. Multiplying 16 (the number of square feet in the area) by 90 (the number of lbs. of safe floor load per square foot) equals 1440, the number of pounds that can be safely stacked in the area. Dividing 1440 by 100 (weight of each container) equals 14, which is the number of containers that can be piled in the area within the safe floor load limit.

The arrangement of containers within a stack has a bearing upon the safety of the stack (i.e. whether it will tip) and upon the ventilation of the stack itself. Where stacks are to be more than 2 or 3 tiers high, it is essential that the containers be "tied-in" or "locked." Where ventilation is of particular importance, space should be left between containers, and pallets should be placed at regular intervals between tiers to provide freer circulation of air within the stack. Examples of correct methods of stacking are shown in Figure 1, Page 14, and Figure 2, Page 15.

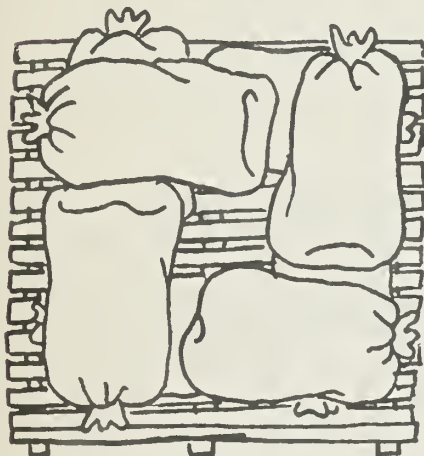


Lock Stack for Beans, Rice, Meal and Flour, 100 lb. Sacks

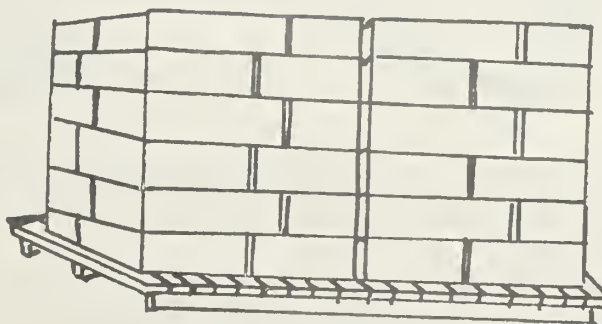
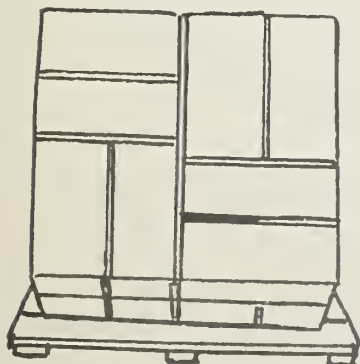
No. Bags per Tier - 3
 No. Tiers - 5
 No. Bags per Load - 15
 Approx. Wt. per Load - 1500 lbs.
 Pallet Size - 40" x 48"



No. Bags per Tier - 4
 No. Tiers - 5
 No. Bags per Load - 20
 Approx. Wt. per Load - 2000 lbs.
 Pallet Size - 40" x 48"

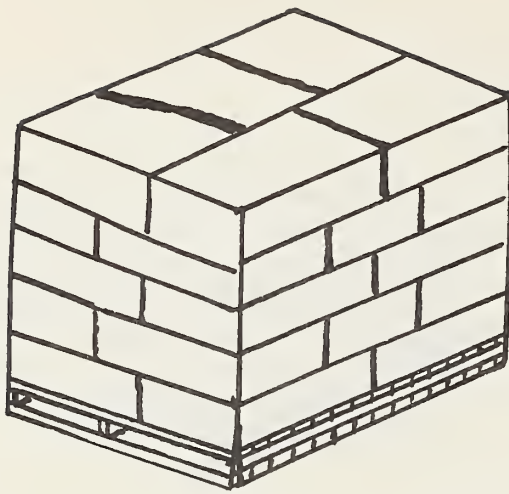


Chimney Style Piling and Stacking of 10#, 25#, and 50# Sacks of Rice, Flour, and Meal.

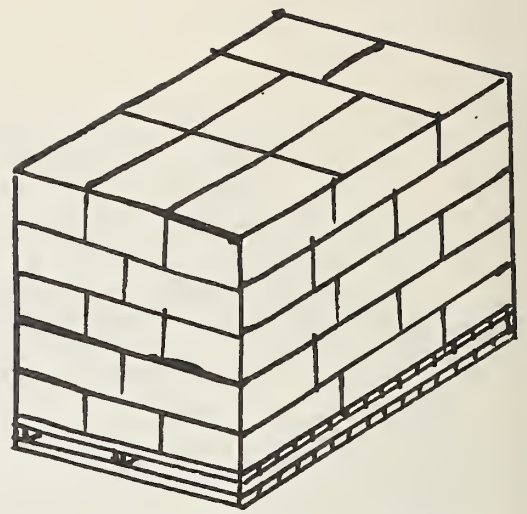


Stacking Dried Fruits

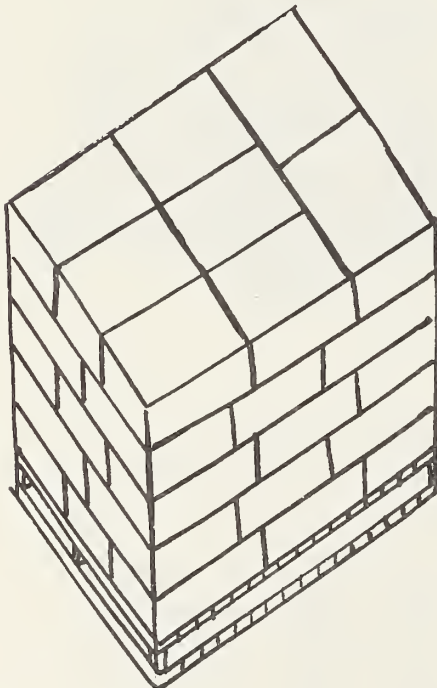
Figure 1. - Methods of stacking.



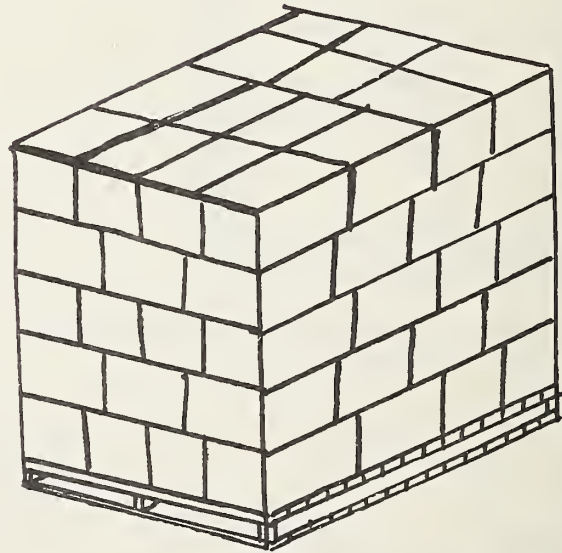
No. 10 Can - 6 Cans per Case
 No. Cases per Tier - 5
 No. Tiers - 5
 No. Cases per Load - 25
 Approx. Wt. of Load - 1225 lbs.
 Pallet Size - 32" x 40"



No. 10 Can - 6 Cans per Case
 No. Cases per Tier - 8
 No. Tiers - 5
 No. Cases per Load - 40
 Approx. Wt. of Load - 1960 lbs.
 Pallet Size - 40" x 48"



No. 2 Can - 24 Cans per Case
 No. Cases per Tier - 8
 No. Tiers - 5
 No. Cases per Load - 40
 Approx. Wt. of Load - 1520 lbs.
 Pallet Size - 32" x 40"



No. 2 Can - 24 Cans per Case
 No. Cases per Tier - 14
 No. Tiers - 5
 No. Cases per Load - 70
 Approx. Wt. of Load - 2660 lbs.
 Pallet Size - 40" x 48"

Figure 2. - Methods of Stacking

RECOMMENDED STORAGE PRACTICES

Chart and number each floor, or section of a floor, and file in the manager's office for ease in locating commodities and recording unused space.

Mark, date, and/or number commodities for easy identification.

Store new shipments of commodities in back of the older shipments to facilitate removal of old stock first. Follow "first in-first out" practice relentlessly.

Store quick turnover items (for example, canned fruits and vegetables) nearest the issue points.

Store broken lots and "attractive" items in locked separate rooms, or screened-off sections.

Store heavy items in area with the maximum floor load capacity.

Store similar and/or identical commodities together, in groups, i.e., Canned Commodities; Dried Fruits; Dried Beans; Rice; Flour; Cornmeal.

Store commodities subject to insect infestation in separate sections of the warehouse, or allow a minimum of four (4) feet between group stacks to minimize the possibility of insect infestation spreading from one group of commodities to another group.

Store commodities away from warehouse walls, (preferably two feet) heating plants, hot water or steam pipes, radiators.

Store commodities away from direct exposure to sun rays - cover or paint windows; store not closer than 15 to 18 inches of the ceiling or cross beams.

Stack commodities for ventilation, etc.

Stack commodities to permit aisle space for inventories, etc.

Store commodities subject to damage from excessive heat in the coolest part of the warehouse.

Store commodities subject to damage by freezing in the warmer parts of the warehouse.

Store commodities which absorb odors away from those that give off odors.

STORING FROZEN FOODS

Store at 0° F. or below.

Store in shipping containers to help prevent freezer burn and/or drying out of products.

If foods have thawed, do not refreeze.

If shipping containers have been damaged, the product should be used immediately or repackaged in vapor-moisture-proof containers before storing.

When it is necessary to remove the product from shipping containers to store in smaller lots, the product should be repacked in vapor-moisture-proof containers before storing.

POINTS TO CONSIDER:

Are commodities adequately inspected and checked upon arrival?

If shipments are short or commodities are out of condition, are they properly reported?

Are proper steps taken to salvage partially out-of-condition commodities?

Are inventory records adequate?

Are out-going shipments properly checked?

Are all receipt and delivery documents properly checked and signed?

Are commodities stacked so as to eliminate danger of their tipping or of crushing the bottom layers?

Do stacks permit air circulation between and within the stacks?

Are commodities stacked on pallets, floor racks, skids or dunnage?

Are stacks arranged within the storage space so as to permit full use of mobile handling equipment?

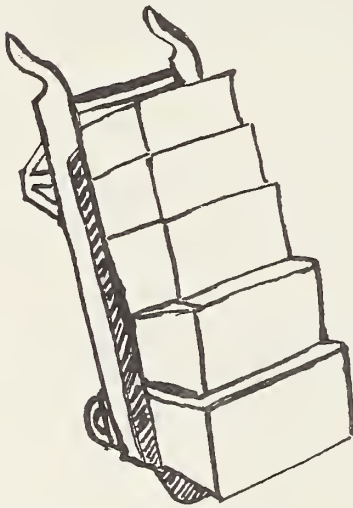
Is the safe floor load capacity considered in determining the heights of the stacks?

PART III CONSERVATION OF SPACE & LABOR

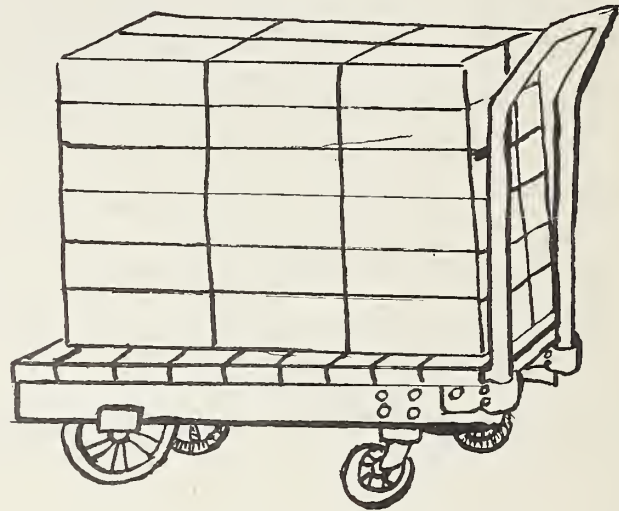
Maximum use of proper equipment & storing aids will do much to increase the efficiency of the operation by conserving space & labor.

EQUIPMENT:

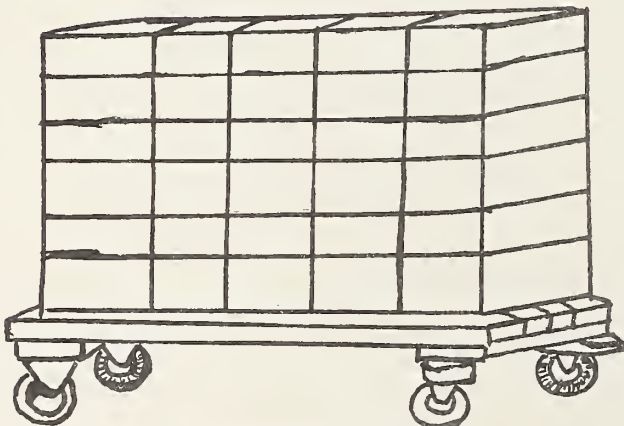
While hand- and mechanically-operated equipment provide the tools for efficient handling and storage of commodities, there are many factors which determine their economy and scope of application, such as the kinds and volume of commodities handled, and the type and size of warehouse in which they are stored. (See Figures 3, 4, 5, and 6 on Pages 19, 20, 21, and 22.)



Hand Truck



Platform Truck

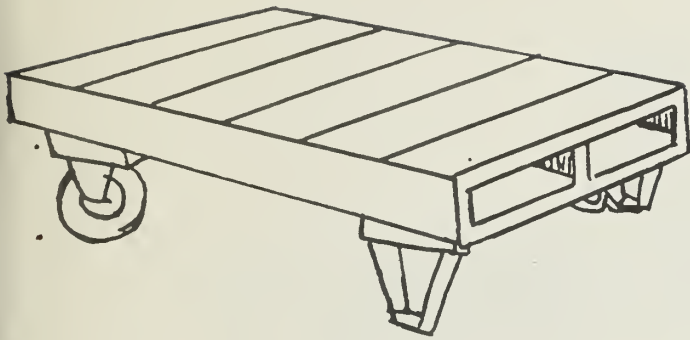


Solid Platform Dolly

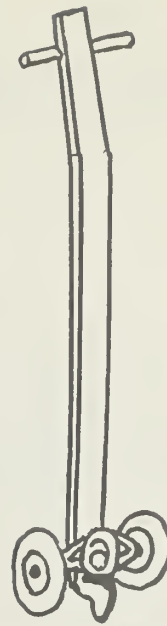


Open Frame Dolly

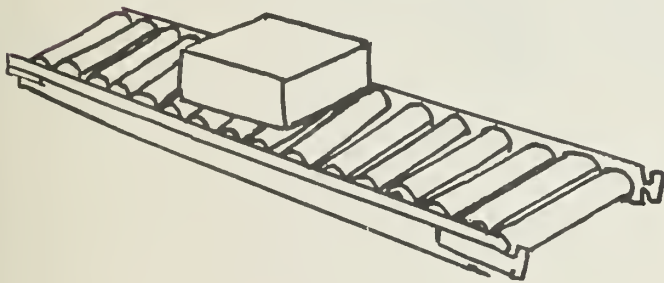
Figure 3. - Hand-operated equipment.



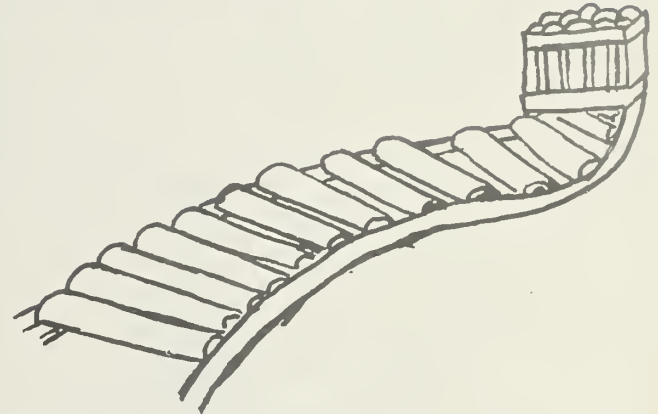
Skid Truck (For Moving and Storing)



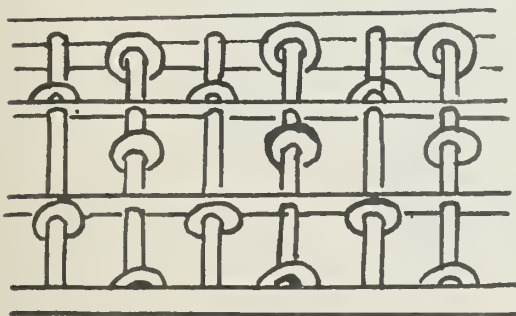
Lift Jack (To be used with Skid Truck)



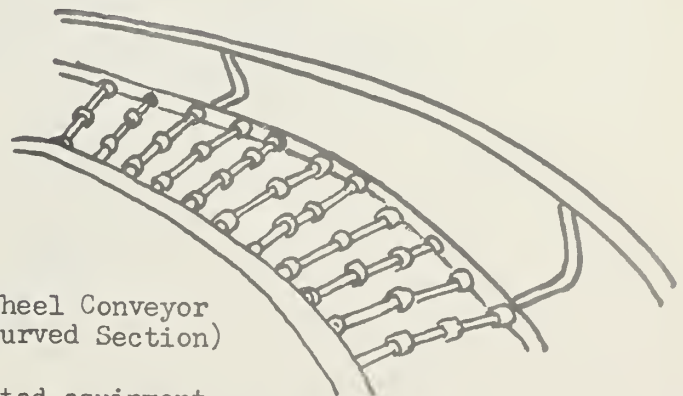
Roller Conveyor (Straight Section)



Roller Conveyor (Curved Section)



Wheel Conveyor (Straight Section)

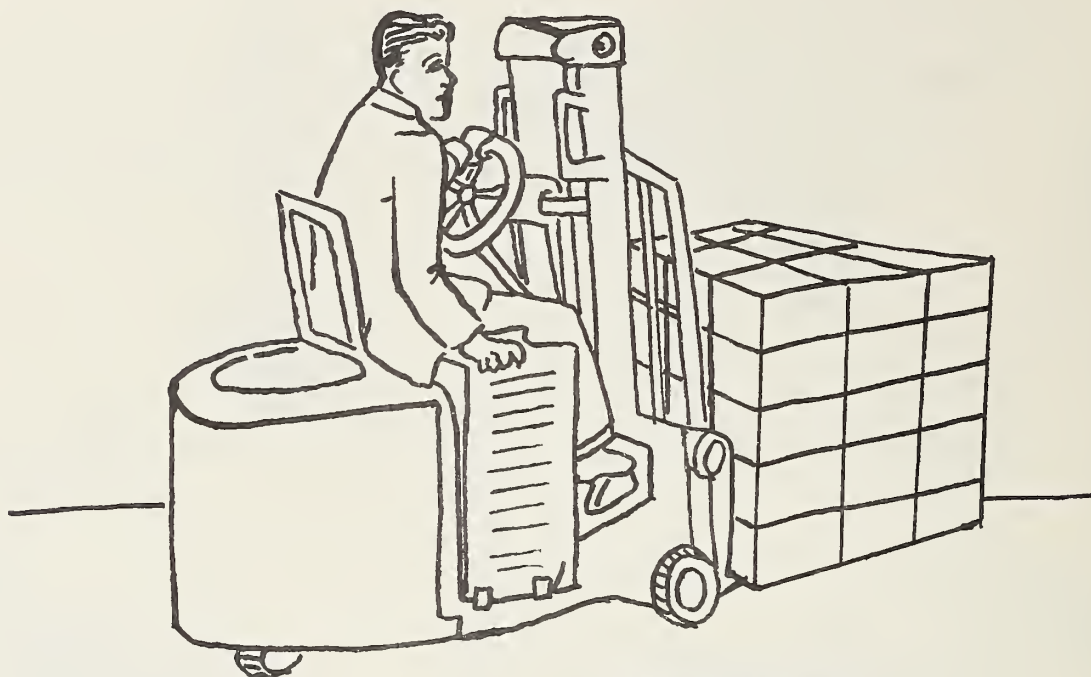


Wheel Conveyor (Curved Section)

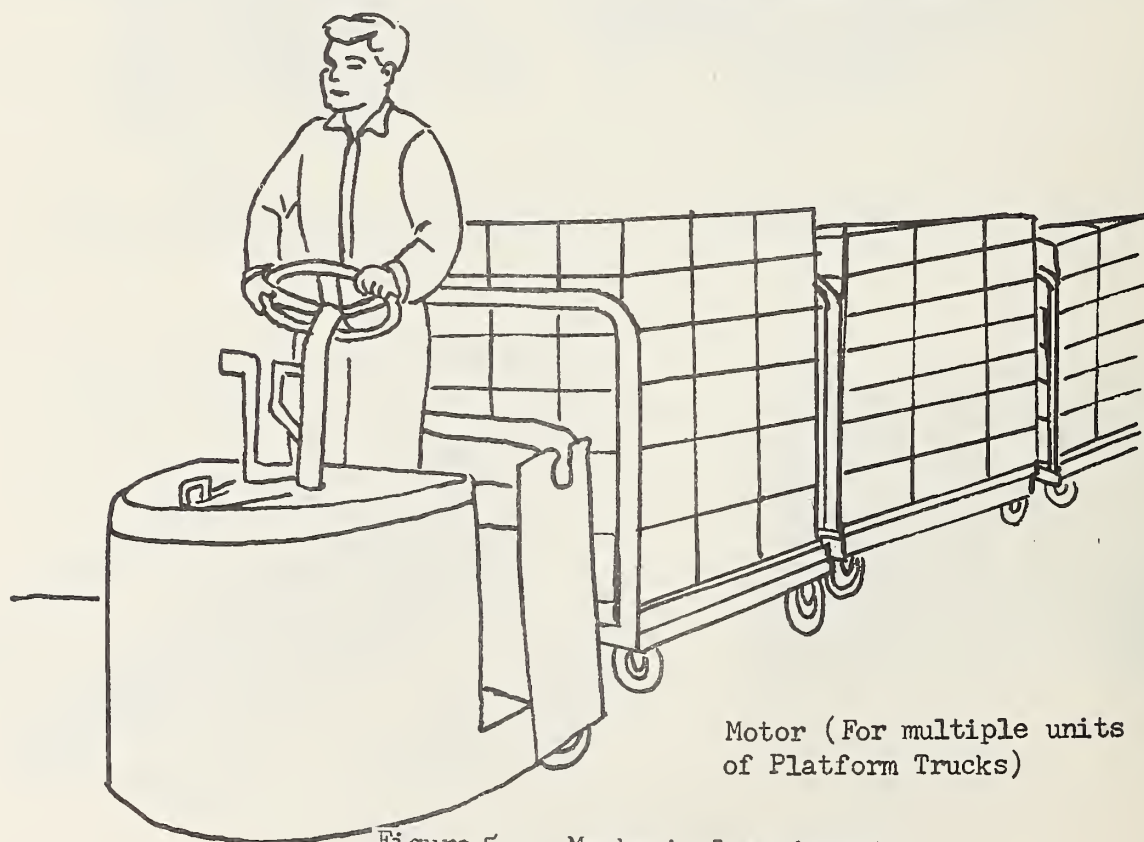
Figure 4. - Hand-operated equipment.

MECHANICAL EQUIPMENT:

This will include either electric or gasoline motor-driven equipment such as fork lift trucks, motors, and conveyor belts. (See Figures 5 and 6)

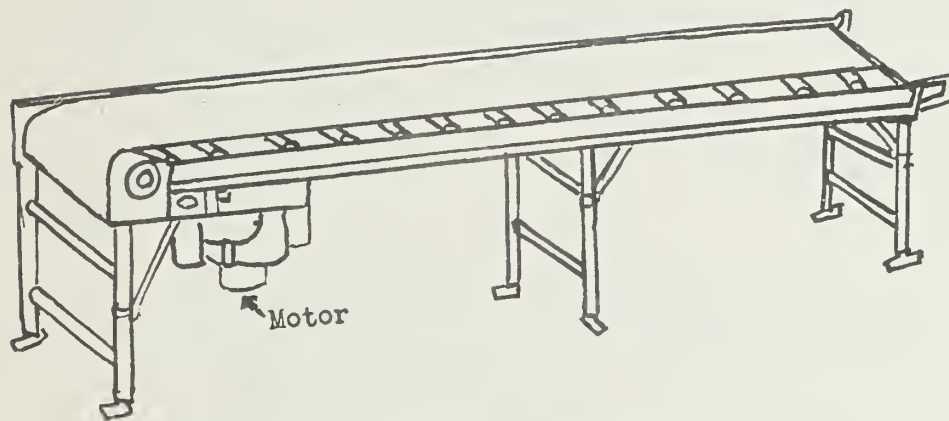


Fork Lift Truck

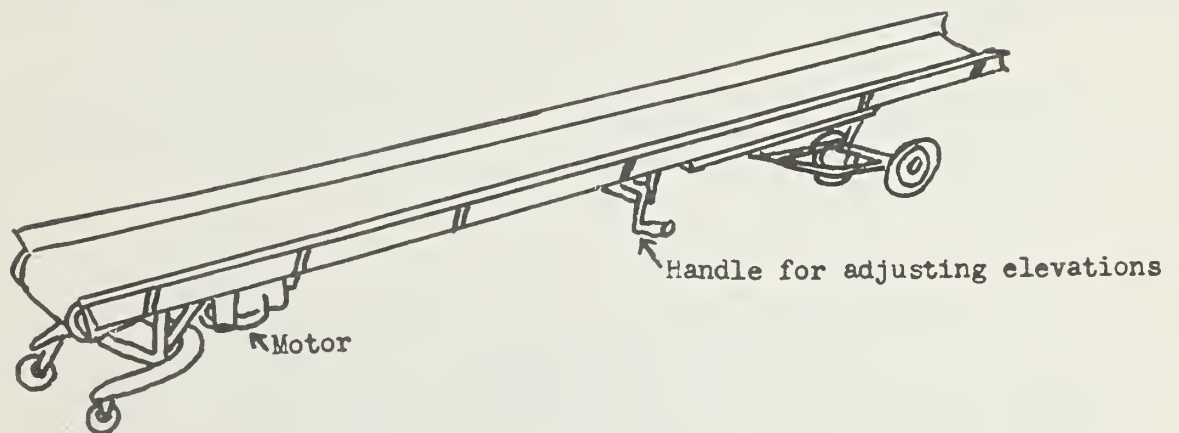


Motor (For multiple units
of Platform Trucks)

Figure 5. - Mechanical equipment.



Belt Conveyor

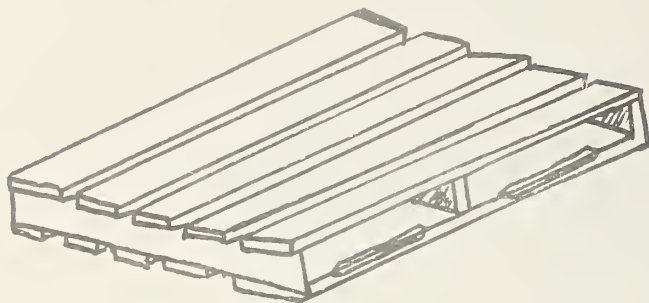


Portable Belt Conveyor

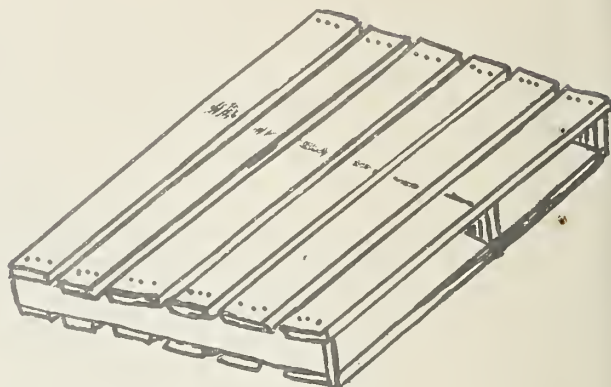
Figure 6 . - Mechanical equipment.

STORING AIDS:

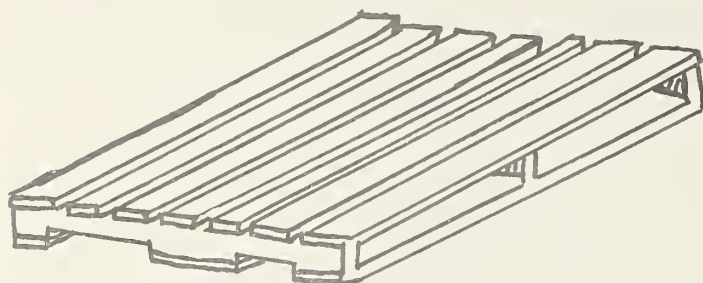
One or more of the following types of storage aids are generally used in warehouses to facilitate the ease of handling and stacking, and to insure good circulation of air around the commodities. (See Figure 7).



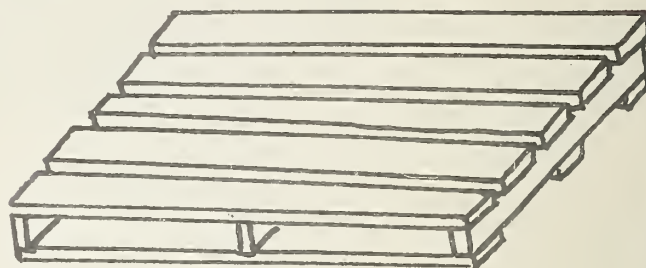
Single Face Non-reversible Pallet
Two-Way Entry (Made from 2"x4" and
1"x4" lumber 32"x40" or 40"x48")



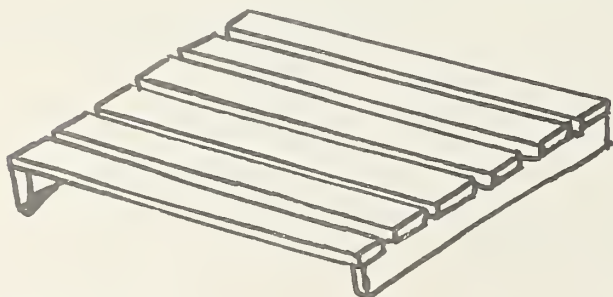
Double Face Reversible Pallet
Two-Way Entry (Made from 2"x4" and
1"x4" lumber 32"x40" or 40"x48")



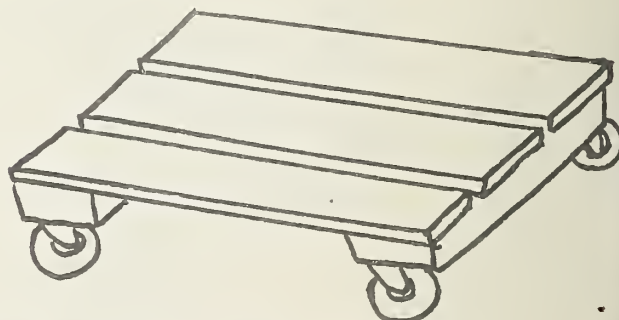
Single Face Non-reversible Pallet
Notched Stringer Four-Way Entry
(Made from 2"x4" and 1"x4" lumber
32"x40" or 40"x48")



Floor Rack or Pallet 36"x48" up to
10' or 12' long. (Made from 2"x4"
and 1"x4" lumber)



Standard Skid
32"x40" or 60" up to 10' long



Heavy-Duty Floor Rack on Casters
32"x40" or 40"x48" (Made of 2"x8"
planks and 4-6" diameter 2" Face
roller-bearing and ball-bearing
swivel casters. Use $\frac{1}{2}$ " or $\frac{3}{4}$ "
carriage bolts for putting together.)

Figure 7. - Storing aids

POINTS TO CONSIDER:

Is handling equipment used to the maximum extent practicable?

Could operations be more efficient if additional or different handling equipment were used?

Is warehouse personnel used to the best advantage? Are they properly trained in their duties?

